

LF Magnetosheath Electromagnetic Plasma Waves in the Cassini Near-Earth Flyby: Proton Cyclotron Waves

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The Cassini spacecraft flew through the Earth's bow shock, magnetosheath and magnetopause along the Earth-Sun line, giving a unique perspective of these regions of space. The bow shock had an unusually low Mach number. The magnetosheath field had a $B_x \sim -40$ nT just upstream the magnetopause. The magnetosheath was filled with some of the largest amplitude ion cyclotron waves detected in geospace to date, ~ 15 nT peak-to-peak amplitudes in a ~ 30 nT field. The nature of the waves and their generation mechanism will be discussed. The presence of the ion cyclotron mode and the lack of the mirror mode is of particular interest. The properties of the bow shock, magnetosheath (waves) and magnetopause will be discussed in the light of upstream solar wind conditions.

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